



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,024	09/15/2003	Khalil Amine	Q201-US1	2546
31815	7590	09/20/2007	EXAMINER	
MARY ELIZABETH BUSH			ECHELMAYER, ALIX ELIZABETH	
QUALLION LLC				
P.O. BOX 923127			ART UNIT	
SYLMAR, CA 91392-3127			PAPER NUMBER	
			1745	
			MAIL DATE	
			DELIVERY MODE	
			09/20/2007	
			PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/663,024	Applicant(s) AMINE ET AL.	
	Examiner Alix Elizabeth Echelmeyer	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,7,9,13-33 and 45-49 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7,9,13-18,21-33 and 45-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed July 5, 2007. Claims 1, 13 and 30 have been amended. Claims 2, 3, 6, 8, 10-12 and 34-44 have been cancelled. Claims 19 and 20 were withdrawn in response to a previous restriction requirement.

Claim Objections

2. Claim 30 is objected to because of the following informalities: the term "[EO]/[Li]" is not previously defined in the claims, but is found in the specification at, for example, [0029]. Appropriate correction is required. Please define the term before the abbreviation is used in the claim.

Claim Rejections - 35 USC § 112

3. The 35 U.S.C. 112 second paragraph rejections of claims 8 and 30 are withdrawn in light of the amendments.

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1745

5. Claims 47-49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The specification provides support for a solid electrolyte having a polysiloxane structure represented by either the formula of the instant claim 8 or of the formula of the instant claim 47 ([0009], [0011]). Also disclosed is a blend of network polysiloxanes and a cyclic polysiloxane ([0044]). The specification does not support the blending of the cyclic polysiloxane of claim 1 and the cyclic polysiloxane of claim 47.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 4, 5, 7, 9, 13, 17, 18, 21-25, 28^{30, 45,} and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. (US 6,858,351).

Regarding claim 1, Miura et al. teach an electrolyte for an electrochemical device (column 1 lines 17-18). The electrolyte of Miura et al. includes an organic silicon compound having an ethylene oxide unit (column 1 lines 63-37). The organic silicon

Art Unit: 1745

may be cyclic and contains side chain R^{12} which can be an alkoxy group having 1 to 12 carbon atoms (column 7 lines 4-7, 28-35).

As for claims 4 and 5, the ethylene oxide unit is shown in formula (v) (column 2 lines 55-60). It contains 0 to 3 CH_2 groups (column 2 line 63) and a polyethylene oxide moiety (column 2 line 59).

As for claims 7, 17, 21 and 45, the electrolyte is cross-linked (column 6 lines 60-65).

Regarding claim 13, the electrolyte of Miura et al. also includes a lithium salt (abstract, column 1 line 67).

With regard to claim 18, the electrolyte of Miura et al. may be solid (column 15 line 13).

As for claims 24 and 25, if one side chain of the cyclic polysiloxane (a-3) were replaced by the side chains of the instant invention (see below), then the ratio of side chains to cross-linkers would be 1:4. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Regarding claim 28, the desired molecular weight of the polymer is desirably 10^4 - 10^7 g/mol (column 5 lines 35-40).

As for claim 30, Miura et al. discuss the weight ratio of electrolyte to lithium salt. It is taught that the ratio affects processability, moldability and ionic conductivity of the

electrolyte (column 9 lines 47-57). It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the ratio of electrolyte to lithium salt, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05 (II B).

Regarding claims 1, 22 and 23, although Miura et al. teach an alkoxy side chain, Miura et al. fail to teach the specific structure of the alkoxy side chain claimed and a spacer positioned between the alkoxy side chain and the silicon of the polysiloxane (either cyclic or network).

Miura et al. teach such a side chain and spacer for silicon compounds, see formulas (iv), (v), (vi). This ethylene oxide unit, or the side chain of the instantly claimed invention, prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature (column 8 lines 28-31). Additionally, with regard to claims 4 and 5, the spacer A_{12} or A_{14} includes 0 to 3 $-CH_2-$ groups (column 8 lines 53-54).

Regarding claim 46, R_1 is hydrogen.

It would be within the ordinary level of skill for the art to attach the ethylene oxide unit side chain to the polysiloxane unit, since it is shown by Miura et al. to be a proper side chain and effective as a spacer group, especially since such a side chain prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to attach the ethylene oxide unit side chain to the polysiloxane unit, since such a side chain prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Wietelmann et al. (WO 02/28500 A1, with US Pre-Grant Publication 2004/0096746 serving as a translation).

The teachings of Miura et al. as discussed above are incorporated herein.

Miura et al. teach an electrolyte including a cyclic silicon compound having an ethylene oxide unit and a salt.

Miura et al. fail to teach that the specific lithium salt, for example a lithium bis(chelato) borate.

Wietelmann et al. teach that the use of lithium chelato complexes, such as lithium bis(oxalate) borate, is common in lithium batteries [0002]).

It would be desirable to one having ordinary skill in the art to use the lithium chelato complexes of Wietelmann et al. to provide chemical stability and good conductivity.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a common of lithium chelato complexes, such as lithium

Art Unit: 1745

bis(oxalate) borate, as the lithium salt in the battery of Miura et al. in order to provide chemical stability and good conductivity.

9. Claims 26, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Narukawa et al. (US Patent 6,534,216).

The teachings of Miura et al. as discussed above are incorporated herein.

Miura et al. teach the electrolyte of claim 1 but fail to teach a solid polymer also included in the electrolyte.

Narukawa et al. teach an electrolyte for a non-aqueous electrolyte cell. Narukawa et al. further teach that as viscosity increases, there is a problem with impregnation of the electrolyte. In order to overcome these problems, the electrolyte is preferable made of solid polymer polyacrylonitrile and solid polymer poly(vinylidene fluoride) (column 4 lines 21-39).

It would be desirable to use the solid polymers of Narukawa et al. in the electrolyte of Miura et al. in order to be able to control the viscosity and impregnation of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the solid polymers of Narukawa et al. in the electrolyte of Miura et al. in order to be able to control the viscosity and impregnation of the electrolyte.

As for claim 29, Miura et al. in view of Narukawa et al. fail to teach the specifically claimed viscosity. It would have been obvious to one having ordinary skill in the art at

Art Unit: 1745

the time the invention was made to determine the optimum viscosity, since viscosity influences the ease with which the electrolyte impregnates. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05 (IIB)

10. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Hanson et al. (US Pre-Grant Publication 2001/0001053).

The teachings of Miura et al. as discussed above are incorporated herein.

Miura et al. teach a lithium battery with the electrolyte of the claimed invention but are silent on the anode and cathode materials. Since the battery is a lithium battery, it inherently would have a lithium-based anode.

Hanson et al. teach a lithium battery having an anode and cathode. Hanson et al. teach that a typical anode for a lithium battery is a lithium material, while a metal oxide such as lithiated vanadium is used for the cathode.

It would be desirable to use the anode and cathode materials of Hanson et al. in the battery of Miura et al. since it is taught by Hanson et al. that those materials are typically used to generate electricity and transfer ions in a lithium battery and since Kang et al. does not disclose specific materials for the electrodes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the anode and cathode materials of Hanson et al. in the battery of Miura et al. since it is taught by Hanson et al. that those materials

Art Unit: 1745

are typically used for the electrodes and since Miura et al. does not disclose specific materials for the electrodes.

Response to Arguments

11. Applicant's arguments, see pages 10-11 of the Remarks, filed July 5, 2007, with respect to the rejection of claim 8 (newly amended claim 1, since claim 8 was incorporated into claim 1 in the amendment) under 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Miura et al., see above.

12. Applicant's arguments concerning cancelled claims 42-44 have been considered, but are moot since the claims were cancelled. The subject matter of the claims was incorporated into newly filed claims 47-49, which are addressed above.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

Art Unit: 1745

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 1, 30 and 47-49 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 11, 12 and 23 of copending Application No. 10/663,023. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of Application No. 10/663,023 require one or more siloxane polymers, and anticipate those disclosed in the instantly claimed invention. Copending claims 1, 11, 12 and 23 contain all the limitations of the instant claims 1, 30 and 47-49 and thus anticipate the instant claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

Art Unit: 1745

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee


SUSY TSANG-FOSTER
PRIMARY EXAMINER